इंटरनेट मानक

Disclosure to Promote the Right To Information

Whereas the Parliament of India has set out to provide a practical regime of right to information for citizens to secure access to information under the control of public authorities, in order to promote transparency and accountability in the working of every public authority, and whereas the attached publication of the Bureau of Indian Standards is of particular interest to the public, particularly disadvantaged communities and those engaged in the pursuit of education and knowledge, the attached public safety standard is made available to promote the timely dissemination of this information in an accurate manner to the public.

“जानने का अधिकार, जीने का अधिकार”
Mazdoor Kisan Shakti Sangathan
“The Right to Information, The Right to Live”

“पुराने को छोड नये के तरफ”
Jawaharlal Nehru
“Step Out From the Old to the New”

IS 4264 (1967): Code of safety for caustic soda [CHD 8: Occupational Safety, Health and Chemical Hazards]

“ज्ञान से एक नये भारत का निर्माण”
Satyanarayan Gangaram Pitroda
“Invent a New India Using Knowledge”

Act Number 22 of 2005
The Indian Parliament
RIGHT TO INFORMATION

Made Available By
Public.Resource.Org

“ज्ञान एक ऐसा खजाना है जो कभी चुराया नहीं जा सकता है”
Bhartṛhari—Nītiśatakam
“Knowledge is such a treasure which cannot be stolen”

BLANK PAGE

BRUTUM FULMEN

IGNORANTIA JURIS NON EXCUSAT

PROTECTED BY COPYRIGHT

IS : 4264 - 1967
(Reaffirmed 2002)

Indian Standard

CODE OF SAFETY FOR CAUSTIC SODA

(Fourth Reprint MAY 1993)

UDC 661·322 : 614·8

© *Copyright* 1967

BUREAU OF INDIAN STANDARDS
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

Gr 3 *November* 1967

AMENDMENT NO. 1 OCTOBER 2010
TO
IS 4264 : 1967 CODE OF SAFETY FOR CAUSTIC SODA

(*Page* 8, *clause* 7.3) — Add the following at the end:

'Alternatively flakes should be packed with HDPE bags/container with HDPE liner.'

(CHD 8)

Reprography Unit, BIS, New Delhi, India

Indian Standard
CODE OF SAFETY FOR CAUSTIC SODA

Chemical Hazards Sectional Committee, CDC 18

Chairman	*Representing*
SHRI N. S. MANKIKER	Directorate General of Factory Advice Service & Labour Institutes (Ministry of Labour, Employment & Rehabilitation), Bombay
Members	
SHRI J. D. ADHIA	Hindustan Organic Chemicals Ltd, Bombay
SHRI S. M. MACHIRAJU (*Alternate*)	
SHRI S. K. BORKAR	Directorate General of Health Services (Ministry of Health), New Delhi
SHRI P. S. RAMACHANDRAN (*Alternate*)	
SHRI J. M. DAVE	Central Public Health Engineering Research Institute (CSIR), Nagpur
DEPUTY DIRECTOR, TRAFFIC (GENERAL)	Railway Board (Ministry of Railways), New Delhi
SHRI J. M. GUHA	Ministry of Petroleum and Chemicals
DR G. JAYARAMA RAO (*Alternate*)	
DR JAGDISH SHANKAR	Atomic Energy Establishment Trombay, Bombay
SHRI JOGINDER SINGH	Directorate General of Technical Development, New Delhi
SHRI S. N. LAHIRI	Department of Explosives (Ministry of Works and Housing)
SHRI S. C. ROY (*Alternate*)	
SHRI C. C. MANIAR	Indian Chemical Manufacturers' Association, Bombay
DR V. C. MANKODI	Hindustan Steel Ltd, Ranchi
DR B. N. CHAKRAVARTY (*Alternate*)	
SHRI M. N. KHANNA (*Alternate*)	
DR C. N. K. MURTHY	Ministry of Defence (DGI)
SHRI R. S. AGARWAL (*Alternate*)	
SHRI NARENDRA SINGH	Ministry of Defence (R & D)
DR K. J. BALAKRISHNA (*Alternate*)	
REPRESENTATIVE	Indian Institute of Petroleum (CSIR), Dehra Dun
SHRI M. VENUGOPAL	The Western India Match Company Ltd, Bombay
DR SADGOPAL, Director (Chem)	Director General, ISI (*Ex-officio Member*)

Secretary

DR A. K. BHATTACHARYA
Deputy Director (Chem), ISI

(*Continued on page* 2)

BUREAU OF INDIAN STANDARDS
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

(*Continued from page* 1)

Industrial Chemical Hazards Subcommittee, CDC 18 : 4

Convener	*Representing*
Shri S. R. Bhise	Directorate General of Factory Advice Service & Labour Institutes (Ministry of Labour, Employment & Rehabilitation), Bombay
Members	
Shri J. D. Adhia	Hindustan Organic Chemicals Ltd, Bombay
Shri S. M. Machiraju (*Alternate*)	
Shri J. M. Dave	Central Public Health Engineering Research Institute (CSIR), Nagpur
Deputy Director, Traffic (General)	Railway Board (Ministry of Railways)
Dr R. M. Desai	Indian Chemical Manufacturers' Association, Bombay
Shri O. P. Gupta	Directorate General of Ordnance Factories (Ministry of Defence)
Shri S. C. Das Gupta (*Alternate*)	
Shri S. Jagannathan	Esso Standard Eastern Inc, Bombay
Shri K. V. Vijayaraghavan (*Alternate*)	
Shri Joginder Singh	Directorate General of Technical Development, New Delhi
Shri G. A. Kulkarni	Amar Dye-Chem Limited, Bombay
Shri S. N. Lahiri	Department of Explosives (Ministry of Works and Housing)
Shri S. C. Roy (*Alternate*)	
Dr U. C. Patel	Union Carbide India Limited, Calcutta
Shri K. C. Raghavan	D. Waldie and Company Limited, Calcutta
Dr R. Chatterjee (*Alternate*)	
Shri M. L. Seth	The D. C. M. Chemical Works, New Delhi
Shri L. R. Gautam (*Alternate*)	

Panel for Drafting Safety Codes for Hazardous Chemicals, CDC 18 : 4 : 1

Convener	
Shri M. L. Seth	The D. C. M. Chemical Works, New Delhi
Members	
Shri L. R. Gautam (*Alternate* to Shri M. L. Seth)	
Shri S. K. Babat	Fertilizer Corporation of India Limited, Sindri
Shri B. N. Chakravarty	Hindustan Steel Limited, Ranchi
Dr K. Viswanathan Nayar	Fertilizers and Chemicals Travancore Limited, Alwaye

Indian Standard
CODE OF SAFETY FOR CAUSTIC SODA

0. FOREWORD

0.1 This Indian Standard was adopted by the Indian Standards Institution on 14 June 1967, after the draft finalized by the Chemical Hazards Sectional Committee had been approved by the Chemical Division Council.

0.2 Caustic soda is an important basic chemical having large-volume use in industries such as rayon, paper and soap in addition to its use in a very large number of industries as an auxiliary process chemical. Caustic soda is a corrosive chemical and handling of it presents various hazards which are better prevented than cured. A sound code of practice will reduce the frequency of hazards and also, in many cases, the amount of damage caused by an accident.

1. SCOPE

1.1 This standard prescribes a code of safety concerning hazards relating to caustic soda. It describes the properties and essential information for the safe handling and use of caustic soda.

2. TERMINOLOGY

2.1 The terms defined in IS : 4155-1966* and IS : 4167-1966† shall apply.

3. PROPERTIES OF CAUSTIC SODA

3.1 Physical Properties — Important physical properties are:

a) *Physical state* — solid,
b) *Colour* — white or light grey,
c) *Melting point* — 310 to 320°C, and
d) *Hygroscopicity* — hygroscopic and deliquescent

3.2 Chemical and Hazardous Properties

3.2.1 Caustic soda corrodes clothing and a few metals, such as aluminium, tin, lead, zinc and alloys containing these metals; slowly corrodes iron, copper and Monel metal.

---

*Glossary of terms relating to chemical and radiation hazards and hazardous chemicals.

†Glossary of terms relating to air pollution.

3.2.2 Caustic soda destroys living tissues. Considerable heat is generated on adding water to solid caustic soda or its strong solutions and this may cause boiling and spattering of hot solution.

4. HAZARDS ASSOCIATED WITH CAUSTIC SODA

4.1 Health Hazards — Caustic soda is dangerous when carelessly handled. Solid caustic soda or its solutions have marked corrosive action on all tissues of body. Signs and symptoms of irritation do not immediately become evident after contact with caustic soda, as a result, the worker may suffer injury before he realizes that the chemical is in contact with his body.

4.1.1 *Acute Toxicity*

4.1.1.1 *Local effects* — Caustic soda is dangerous to live tissue. Contact with it causes burns, frequently deep ulceration and ultimate scarring. Severe burns result not only from the solid alkali but also from solutions of this compound. Even dilute solutions on prolonged contact exert a destructive effect on tissues. Caustic soda is a strong primary irritant. Multiple small burns may result from exposure to dust or mist of the material. Contact with eyes either of solid caustic soda or its solutions may rapidly cause severe damage to the delicate eye tissues. Molten caustic causes severe injury both by reason of high temperature (above 320°C) and corrosive nature of the compound. Ingestion either of the solid caustic soda or its solution results in damage to mucuous membranes or deeper tissues. As a result, perforation may follow or subsequent extensive scar formation may occur. Death may occur if vital areas are penetrated into. Scarring may so constrict the damaged tissues that extensive corrective surgery may be required. Inhalation of the dust or concentrated mist may cause damage to upper respiratory tract and even to the lung tissue proper. The effects of irritation may vary from mild irritation of nasal membranes to severe pneumonitis depending on the severity of the exposure.

4.1.1.2 *Systemic effects* — No general or systemic effects are noted except those resulting from shock or those secondary to tissue damage.

4.1.2 *Chronic Toxicity*

4.1.2.1 *Local effects* — Repeated contact with dilute solutions may cause superficial destruction of skin in multiple areas and primary irritant dermatitis may result. Repeated inhalation may similarly cause varying degrees of irritation to the tissues of the respiratory passage.

4.1.2.2 *Systemic effects* — There are none except those secondary to tissue damage.

5. HANDLING AND STORAGE

5.1 Handling

5.1.1 In handling caustic soda solution care should be taken to avoid solidification in the pipe lines and equipment. The strength of the solution may be easily determined from its density. All equipment should be kept clean by washing of the accumulation of solidified caustic and sodium carbonate that forms around small leakages. When disconnecting equipment or pipe lines, make sure that they are empty of caustic and they are washed. At such times, a hose with running water should always be available. Glandless pumps should preferably be used, otherwise packing glands of pumps should be shielded in order to prevent spraying of caustic solution. When spillage has occurred of solid or flakes it should be swept carefully with a broom and the area hosed down. In case of spillage of solution, the floor should be washed with water from a hose rather than swept.

5.1.2 Molten caustic has a temperature range of 320 to 400°C. Extreme care should be taken to avoid spurting of molten caustic in the caustic filling yard. The yard should be always kept clean. Any overflow or spillage of molten caustic should be allowed to solidify and then immediately washed away, otherwise a dangerous slippery surface will be left on the floor. Handling filled drums of molten caustic is a dangerous practice which should not be followed unless the operator is well guarded. If hot caustic is to be run into a container the latter should be absolutely dry and free of acid to guard against explosion. When liquid enters into a container, extreme caution should be exercised to prevent splashing.

5.1.3 Accidents frequently occur while taking samples of molten caustic soda. A long handled nickel or steel ladle of small capacity should be used to scoop out the sample. It is not advisable to take samples of flowing molten caustic as there is always danger of spurting. Goggles, gloves, gum boots, aprons and safety helmets should be invariably worn whenever handling molten caustic soda. The supervisory staff should constantly bear in mind that all safety equipment should be properly and constantly used. The most common hazard is to the eye and should always be protected by suitable goggles. Use of transparent face shield is recommended in addition to safety goggles.

5.1.4 Solid caustic should be ground and flaked in a separate well ventilated room remote from other work rooms. Each man in the grinding room should be provided with adequate type of personal protective equipment.

5.1.5 *Equipment for Handling*

5.1.5.1 Pots containing boiling caustic soda should be provided with exhaust hood to carry off the mists and sprays.

5.1.5.2 Evaporators and similar vessels used in handling liquid caustic soda under pressure should be tested periodically with cold water according to the standards laid down in the relevant pressure vessels code.

5.1.5.3 Tanks should be provided with overflow arrangements in such a way that the liquid is conveyed to a safe place without causing harm to workers nearby.

5.1.5.4 Stuffing boxes are sources of leaks. With modern materials of construction and gland packings or seals, this leakage may be well controlled.

5.1.5.5 To prevent leaks, pipe lines should be of seamless type and have welded flange joints. Depending on temperature and pressure, the gaskets may be of soft rubber or compressed asbestos.

5.1.5.6 Pipe lines exposed to low temperatures should be so arranged that they can-be heated to prevent crystallization of the solution.

5.1.5.7 All equipment used for manufacture, handling, storage or use of caustic soda should be regularly inspected and maintained in good condition.

5.1.5.8 During maintenance work when pipes are to be disconnected, workers should operate from above. Before breaking the point they should ensure that there is no pressure inside and that the line has been thoroughly drained, and if necessary, thoroughly rinsed with water. Flanges should always be opened from the far end. The valve which controls the line should be closed and locked and a 'MAN AT WORK' sign should be hung on it until the repairs are complete.

5.1.6 *Dissolving Caustic Soda*

5.1.6.0 Dissolve solid caustic soda in one of the following ways.

5.1.6.1 Strip the drum and immerse the cake of solid caustic in the dissolving tank of water.

5.1.6.2 Perforate the drum suitably and suspend it above the dissolving tank and pump a stream of water into the drum allowing the solution to flow into the dissolving tank.

5.1.6.3 To avoid iron contamination, peel off the steel drum from solid cake of caustic before dissolving. In bulk addition rapid generation of heat is obtained and there is likelihood of local boiling and spurting of the solution. Dissolve flakes by addition to a well-agitated tank of water. Accidents frequently occur during the handling of caustic soda for making solutions and it is imperative that all safety equipment is properly used in this dissolving department.

5.2 Storage

5.2.1 Drum containers should be stored in dry locations to prevent rusting. They should be periodically inspected and spills, etc, attended to. Rusted containers become weak and they should be handled with extra care.

5.2.2 For stationary storage, mild steel tank or any other properly designed tank with alkali resistant lining should be used. They should be provided with manholes of at least 60 cm diameter protected with grills and cover. Top of the tank should be vented to atmosphere.

5.2.3 All tanks should be capable of being completely isolated from other tanks and processes by suitable valves. Where possible small portions of pipe lines should be removed or blanks should be inserted for additional safety. The tanks should be capable of being drained off completely.

5.2.4 Before repairs or cleaning, tanks should be completely drained and thoroughly washed.

5.2.5 Persons required to enter a tank should first make sure that the tank is empty, has been washed free of alkali and certified so by a competent authorized inspector or inspecting authority. They should wear adequate personal protective equipment including a safety belt securely attached to a rope the free end of which is held by a person standing outside the confined space. Supply of fresh breathable air to persons inside the tank should be ensured by proper means.

6. TANKERS

6.1 Precautions with Tankers — The following points are to be carefully remembered:

a) Tankers, unless they are specifically meant for storage and transport of caustic soda solution, should be thoroughly cleaned of all extraneous matter before use.

b) During loading and unloading, the tanker should be braked and isolated against any movement.

c) While loading and unloading spurting should be avoided and as an additional precaution anti-splash screens should be used.

d) Work on tankers should be supervised by foremen and only workers using approved type of personal protective equipment should be allowed to work.

e) Compressed air should not be used for loading or unloading the tank wagons but pumps or gravity method should be used.

f) All valves should be closed before disconnection.

g) Water should be freely available and used in case of spillage.

h) When empty, all openings and valves should be properly closed and the tanker returned promptly.

j) Safety instructions should be stencilled on both sides of the tanker.

7. PACKING AND LABELLING

7.1 The containers of caustic soda should be labelled with Fig. 7 of IS : 1260-1958* which should contain the following text:

> ' SODIUM HYDROXIDE (CAUSTIC SODA)
>
> *Danger* : Do not get in eyes, on skin or clothing. Do not take internally. In case of contact, flush with water copiously; in case of eyes flush with water for 15 minutes and see the doctor. Use goggles, face-shield, rubber aprons, gloves, gum boots and helmets while handling. '

7.2 Solid — Solid caustic soda should be packed in mild steel drums of 24 gauge or 22 gauge. The container should be securely closed, the lid being tack-welded or expanded to a tight fit. If the closure is not air-tight, moisture and carbon dioxide will be absorbed by casutic soda. Over the lid, a printed sealing foil of tin should be affixed. On this label, it should be clearly stated that the container is carrying a corrosive and caustic chemical. Precautions regarding the handling and the corrosive nature of chemical should be clearly written on the container. It should also be marked with paint with the name of the manufacturer, grade and weight of caustic soda material, and the year and month of manufacture. The container used for solid caustic soda is generally not corrugated.

7.3 Flakes — The mild steel drums used for flakes should be usually of 22 gauge black sheets and should be corrugated for greater strength. The lid should be expanded into position or should be tack-welded. All the other markings should be as for the solid drums. Both solid and flake drums should be black painted.

7.4 Lye — Lye of 50 or 73 percent strength should be transported in tankers. The tankers should be generally painted in light grey or white with an alkali-resistant paint. The words ' caustic soda 50 or 73 percent ' should be painted in large block letters horizontally across the tankers, on both sides. Precautions regarding the handling of the corrosive chemical shall be written on the label or on the printed tin-plate attached to the tanker, and should be prominently displayed. The words ' CORROSIVE CHEMICAL ' should in addition be stencilled on both sides of the tanker.

8. PREVENTIVE MEASURES

8.1 Employee Training — Workers required to handle caustic soda in any form should be instructed about the hazards involved and safe methods of work. They should be provided with adequate and appropriate personal protective equipment and its correct use should be ensured. They should be instructed about basic first-aid measures against alkali and the steps to

---

*Code of symbols for labelling dangerous goods. (**Since revised and split into various parts**).

be taken in the event of spillage of caustic soda. They should be instructed about the location and use of showers, eye fountains, hose lines, etc. Food should not be stored or eaten in a work-area where caustic soda is handled.

8.2 Medical Examination — All new entrants should be given a pre-placement medical examination before they are engaged in the manufacture of caustic soda. All workers should be regularly checked up by a physician with particular reference to dermatitis.

8.3 Personal Protective Equipment

8.3.1 All personnel handling caustic soda in any form should wear the following safety equipment:

a) Suitable close-fitting goggles with side shields.
b) Rubber or PVC gloves for the hands with protection up to elbow. For handling molten and hot concentrated caustic soda (above 110°C), gloves made of asbestos lined inside with PVC or rubber are recommended.
c) Non-slippery rubber gum boots or rubber-coated canvas boots.
d) Rubber apron.
e) Broad-brimmed alkali-resistant plastic or rubber hats to provide protection for head, face and neck from splashing of caustic soda.
f) Suitable respirators or protective hoods when handling flakes, granules or powdered caustic soda.

8.3.2 A readily accessible, well-marked, quick-acting safety shower should be available in the area where caustic soda is handled. Eye-washing fountains or a hose with a soft gentle flow of water should be readily available for eye irrigation. These and all safety equipment should be maintained in good working condition by periodic inspection and repair.

8.4 Accident Investigation — All the accidents occurring in a caustic soda plant should be thoroughly investigated to find out the causes of the accidents and to suggest remedial measures and the detailed report should be recorded properly for future reference.

9. FIRST-AID AND MEDICAL TREATMENT

9.1 General — Speed in removing caustic soda from the affected parts is of primary importance. Whether a full time physician is employed or not, industrial first-aid kits should be kept at all places where caustic soda is handled.

9.1.1 Copious and prolonged application of water to affected part is of foremost importance. The irrigation should be continued for as long as 1 to

2 hours. Contaminated clothing should be removed promptly. In case of severe burns and those involving extensive areas of body shock may ensue, and in this case, patient should be laid in a supine position and kept reasonably warm until the physician, who should be called in attendence at once, arrives. No oil or ointment of any kind should be applied within first 24 hours after exposure or subsequently without orders from the physician.

9.1.2 Neutralization with acid or other chemicals should be postponed until thorough washing has been done. One-percent ammonium chloride or 4-percent boric acid solution is suitable for eye washing. Ten-percent ammonium chloride or 2-percent acetic acid solution is suitable for application to skin.

9.2 Contact with Eyes — Even if minute quantities of caustic soda either in solid or liquid form enter the eyes, they should be irrigated immediately with copious amounts of water for at least 15 minutes. Eyelids should be held apart during washing. A physician preferably an eye specialist should be called at once and if necessary, eye washing may be continued for another 15 minutes until he arrives. After the first washing, few drops of 3·5-percent pontocaine solution or an equally effective aqueous topical anaesthetic may be instilled into the eyes. No oil or oily ointment should be used.

9.3 Ingestion — Do not attempt to induce vomitting. Patient should be encouraged to drink a large quanity of water. Dilute vinegar or a 5-percent solution of ammonium chloride may be administered freely if available. After dilution or neutralization of the alkali, whites of egg or paraffin oil may be taken for soothing effect. Stomach tubes or emetics should not be used unless ordered by the physician.

10. DISPOSAL OF EMPTY CONTAINERS AND WASTE

10.1 Waste containing alkali is harmful to bacterial growth necessary for degradation of organic waste. Such wastes should be properly treated and neutralized before it is led into sewers, rivers, ponds or open fields.

10.2 Disposal of Empty Containers

10.2.1 Empty flake drums should be thoroughly washed with water by filling to the brim, agitating and pouring out the water at least six times. Before washing, the drum should be visually examined to see that no appreciable quantities of caustic flakes are sticking inside.

10.2.2 Solid drums are usually cut open, so the drum sheets should be washed profusely with water before disposal. In case the solid caustic is dissolved out of the uncut drum, the empty drum should be treated like the empty flake drum before disposal.

10.2.3 In the case of returnable flake drums, care should be taken to tightly close and reseal the lid before returning the empty drums.

BUREAU OF INDIAN STANDARDS

Headquarters :

Manak Bhavan, 9 Bahadur Shah Zafar Marg, NEW DELHI 110002

Telephones : 331 01 31
331 13 75

Telegrams : Manaksanstha
(Common to all Offices)

Regional Offices :		*Telephone*
Central	: Manak Bhavan, 9, Bahadur Shah Zafar Marg, NEW DELHI 110002	331 01 31 331 13 75
* Eastern	: 1/14 C.I.T. Scheme VII M, V.I.P. Road, Maniktola, CALCUTTA 700054	37 86 62
Northern	: SCO 445-446, Sector 35-C, CHANDIGARH 160036	2 18 43
Southern	: C.I.T. Campus, IV Cross Road, MADRAS 600113	41 29 16
† Western	: Manakalaya, E9 MIDC, Marol, Andheri (East), BOMBAY 400093	6 32 92 95

Branch Offices :	
'Pushpak', Nurmohamed Shaikh Marg, Khanpur, AHMADABAD 380001	2 63 48
‡ Peenya Industrial Area, 1st Stage, Bangalore-Tumkur Road, BANGALORE 560058	39 49 55
Gangotri Complex, 5th Floor, Bhadbhada Road, T.T. Nagar, BHOPAL 462003	55 40 21
Plot No. 82/83, Lewis Road, BHUBANESHWAR 751002	5 36 27
Kalai Kathir Building, 6/48-A Avanasi Road, COIMBATORE 641037	2 67 05
Quality Marking Centre, N.H. IV, N.I.T., FARIDABAD 121001	—
Savitri Complex, 116 G. T. Road, GHAZIABAD 201001	8-71 19 96
53/5 Ward No. 29, R.G. Barua Road, 5th By-lane, GUWAHATI 781003	3 31 77
5-8-56C L. N. Gupta Marg, (Nampally Station Road) HYDERABAD 500001	23 10 83
R14 Yudhister Marg, C Scheme, JAIPUR 302005	6 34 71
117/418 B Sarvodaya Nagar, KANPUR 208005	21 68 76
Plot No. A-9, House No. 561/63, Sindhu Nagar, Kanpur Road, LUCKNOW 226005	5 55 07
Patliputra Industrial Estate, PATNA 800013	6 23 05
District Industries Centre Complex, Bagh-e-Ali Maidan, SRINAGAR 190011	—
T. C. No. 14/1421, University P. O., Palayam, THIRUVANANTHAPURAM 695034	6 21 04

Inspection Offices (With Sale Point) :	
Pushpanjali, First Floor, 205-A West High Court Road, Shankar Nagar Square, NAGPUR 440010	52 51 71
Institution of Engineers (India) Building, 1332 Shivaji Nagar, PUNE 411005	5 24 35

---

*Sales Office Calcutta is at 5 Chowringhee Approach, P. O. Princep Street, CALCUTTA	27 68 00
† Sales Office is at Novelty Chambers, Grant Road, BOMBAY	89 65 28
‡ Sales Office is at Unity Building, Narasimharaja Square, BANGALORE	22 39 71

Printed at Dee Kay Printers, New Delhi, India